

The essence of your success



**Optimize your ethanol production process
with ZEISS spectroscopy solutions**



Seeing beyond

www.zeiss.com/ethanol-industry

A broad spectrum of quality

ZEISS – over 140 years of experience in spectroscopy

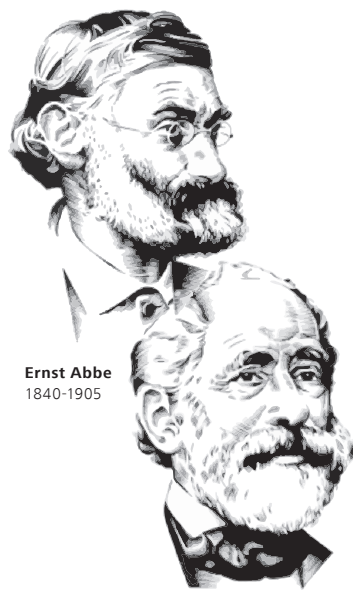
Ernst Abbe developed the world's first spectrometer for a company that Carl Zeiss founded 28 years earlier in Jena in 1874. Today, over 140 years after Abbe's spectrometer, ZEISS is one of the world's leading technology companies in the optical and optoelectrical industry with over 30,000 employees in nearly 50 countries and approximately 120 distribution, service, production and development facilities.

From the beginning, the name ZEISS has stood for continuity and foresight as well as for passion and responsibility. Most importantly of all, the name has stood for globally leading optical measurement technology. Our vision is the perfection of spectroscopy solutions for process and quality control. We've always been the first to bring high-quality technology to the marketplace. Like in 1924, when we developed a photometer that allowed us to measure colors. Or in 1968, when we created the SPECORD series of two-beam spectral photometers for laboratory analyses. Or in 1999, when we set new standards for the agricultural industry with an NIR spectrometer mounted onto a harvester.

Throughout our history, we have always developed new technology that has made processes reproducible and minimized production losses. By fulfilling the quality expectations for products "Made in Germany", we've helped our clients to fulfill their promises to their own customers. This has led to the development of a business area specializing in material analysis, spectroscopy and process analytics, which now plays a key role in the company's global success.

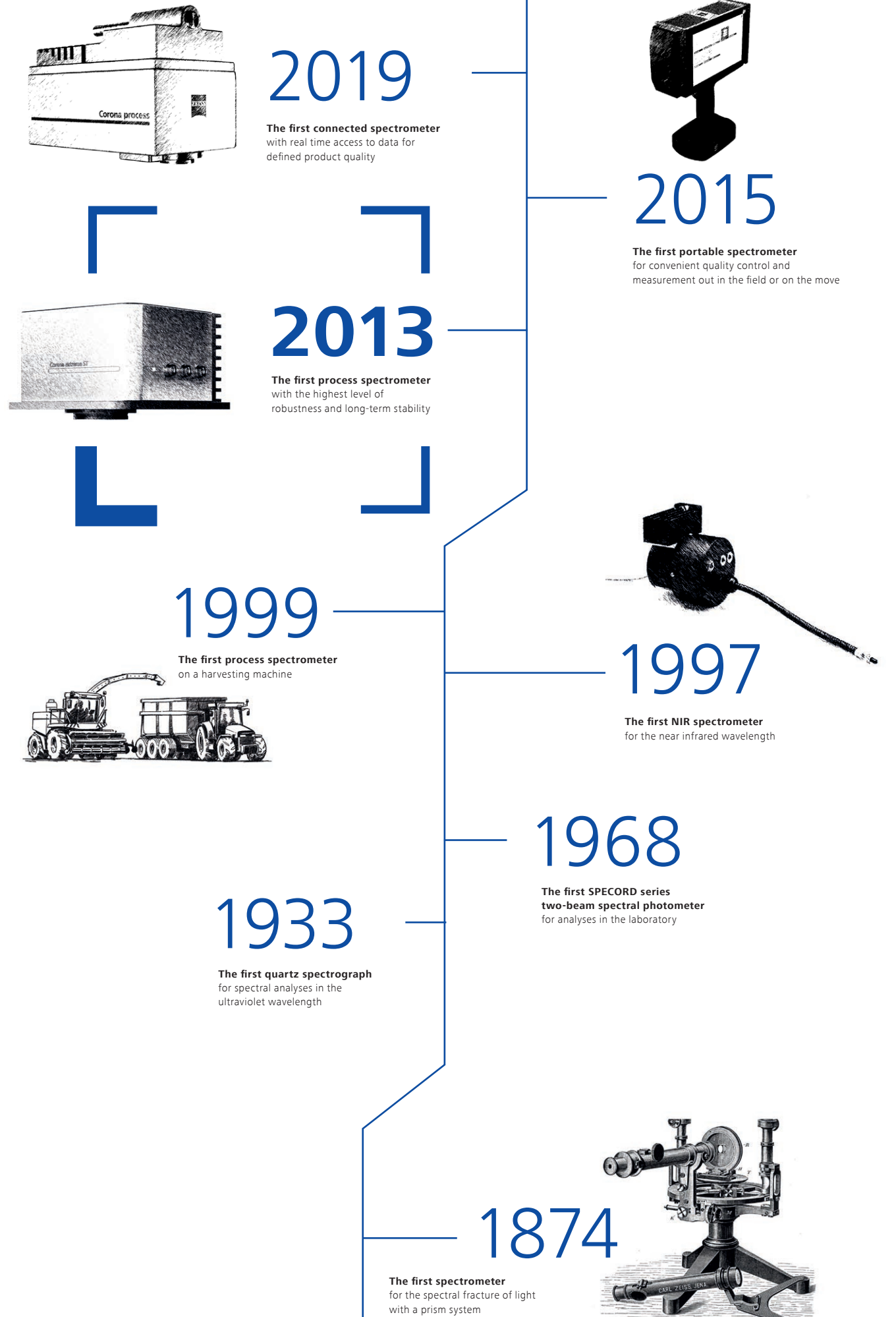
ZEISS spectrometers are as versatile as they are accurate, providing unparalleled performance. Regardless of whether they are a permanent fixture in your production, such as Corona® extreme and Corona® process from ZEISS or whether they are mobile and used in the field, such as AURA® handheld NIR from ZEISS, you can obtain the best results in almost any environment and our spectrometers are tailored to your process. This means that our solutions are not only sought after in areas such as food production and agriculture, but also beyond our own atmosphere: ZEISS high-performance gratings are used in satellites that monitor the air quality on earth, for example.

From food production to harvesting and space, the use of ZEISS equipment provides a technological edge. This is also what drives us every day: maximum efficiency and sustainability as well as long-term success and satisfaction for our customers.



Ernst Abbe
1840-1905

Carl Zeiss
1816-1888



Fueling your growth

With the Corona[®] extreme full-scale spectrometer from ZEISS

To provide the best possible quality and ensure secure your profit margins in corn-based ethanol production, you need optimum control.

The Corona[®] extreme full-scale spectrometer gives you exactly that, allowing you to monitor the quality of your raw ingredients and byproducts at all times – in real time. From the moment the grain is delivered, through to fermentation, Corona[®] extreme provides accurate and reliable measurement results at the crucial stages of production.

When the going gets tough, Corona[®] extreme gets going

From operating temperatures of -15 °C to 50 °C and shocks of up to 50 times the force of gravity, Corona[®] extreme is at home in challenging environments. All the while providing accurate, repeatable and dependable real-time measurements results. As a full-scale spectrometer, it can measure various parameters at the same time, such as moisture, oil, starch and protein content in the 950 to 1,650 wavelength range. Regardless of whether you need measurements in the lab or in-line and under constantly variable conditions, Corona[®] extreme allows you to optimize your processes and maximize efficiency, no matter how tough the going gets.



Corona[®] extreme mounted to a downpipe using a power flange at a mill

A few extremely good arguments

Integrating Corona[®] extreme into your process provides you with a wide range of benefits and flexible options. For example, you can:



Accurately measure various quality parameters at the same time



React quickly to process variations and make adjustments in real time



Optimize product quality constantly by using accurate results in your decision making



Get exact, reliable and consistent results, time and time again



Easily integrate Corona[®] extreme into your existing networks



Analyze complete raw material, allowing you to rate suppliers based on factors such as moisture and starch content



Perform in-line measurement of corn both as whole grains and ground



Perform measurement and quality management of DDGS, allowing for a specified by-product

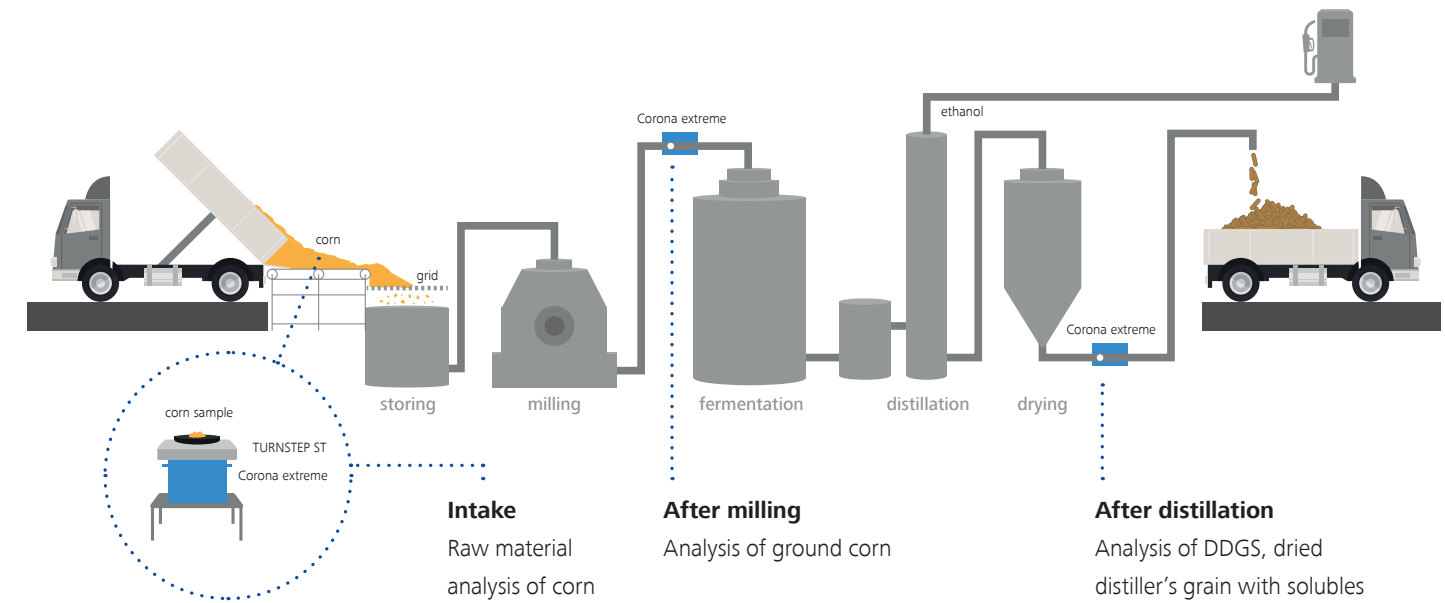


Optimization of additives, allowing for reductions in production costs.



Fast in-line measurement of starch content

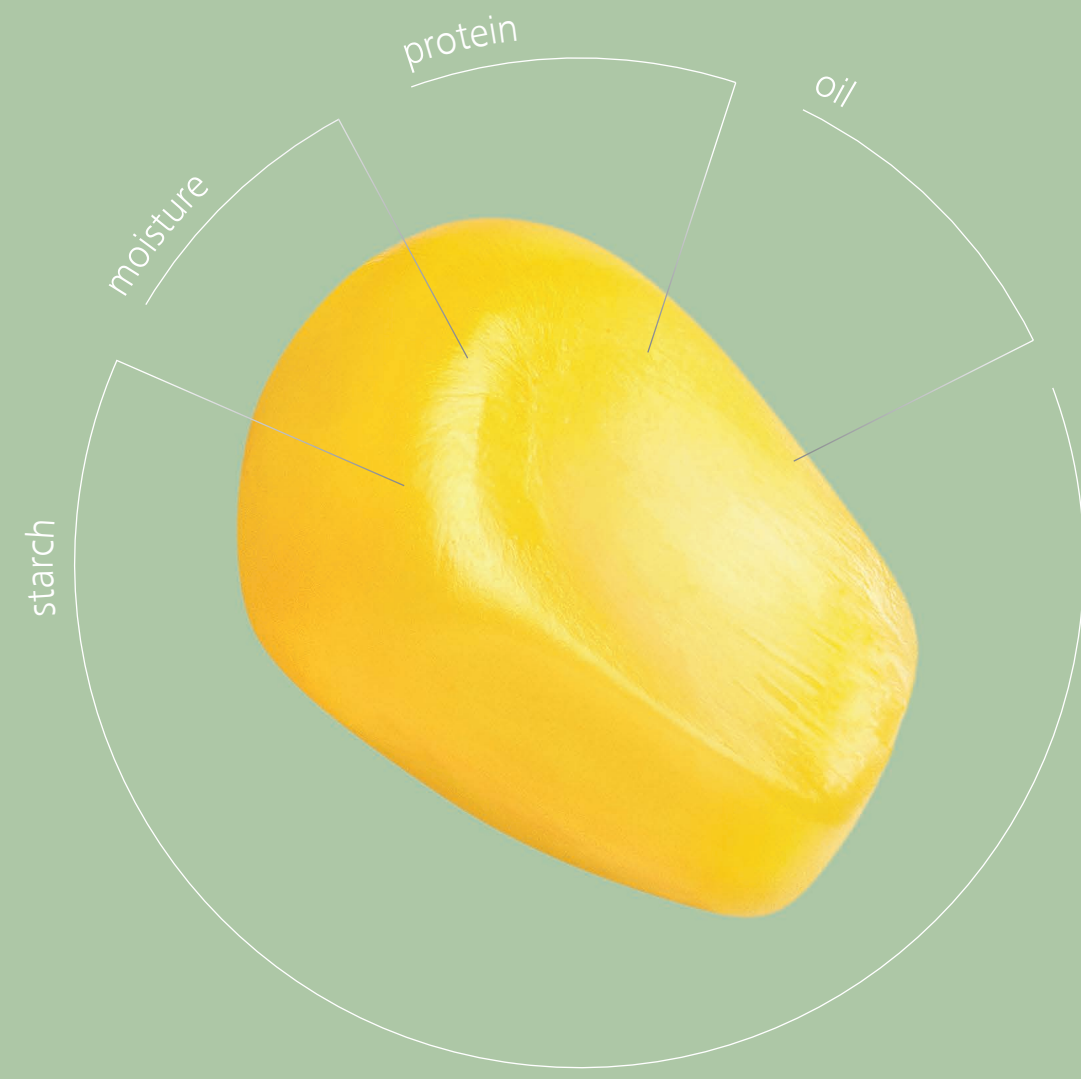
Make the most of your raw material – including the waste



Intake
Raw material analysis of corn

After milling
Analysis of ground corn

After distillation
Analysis of DDGS, dried distiller's grain with solubles



ZEISS Corona® extreme is designed to help you maximize yields and provide consistent quality. For example, it helps optimize the fermentation process by providing precise measurement of starch and protein content after grinding. This allows for more accurate dosage of additives and enzymes. When it comes to byproducts, constantly monitoring moisture, protein, oil and fiber levels in distiller's dried grains with solubles (DDGS) can improve quality and achieve higher prices in the marketplace. Corona® extreme is the ideal solution to keep your product consistent and keep your clients happy.

Corn

Measuring point	Intake
Measurement parameters	Moisture, starch, protein, oil, density

Ground corn

Measuring point	After milling
Measurement parameters	Moisture, starch, protein, oil

DDGS

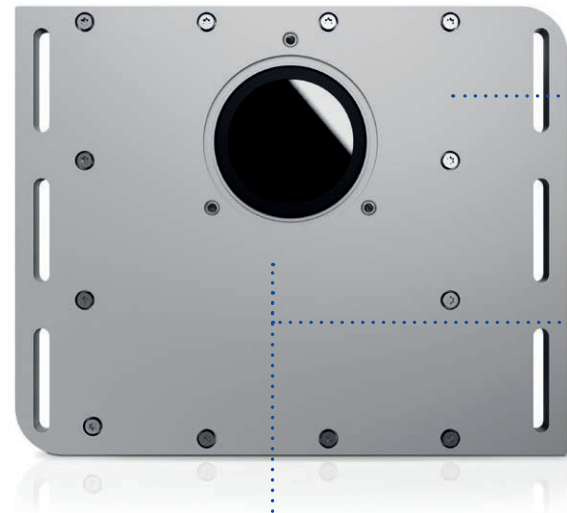
Measuring point	After distillation and drying
Measurement parameters	Moisture, protein, oil, fiber



ZEISS solutions
for the
ethanol industry

The Hardware

Robust in any position

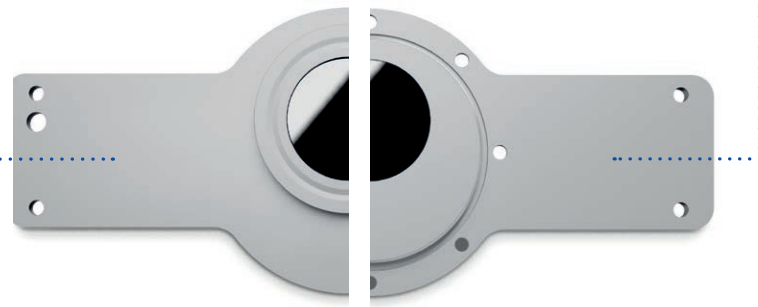


1. Robustness for extreme environments

Degree of protection: IP 66
 Operating temperature: -15 bis 50 °C
 Storage temperature: -40 bis 70 °C
 Shockproof up to 50 G

2. Simple and fast installation

Various flanges for perfect fitting on pipelines, trough chain conveyor, mixer or other transport systems



3. LED status display for operational readiness

Comfortable monitoring of functional activity

4. Full-scale spectrometer system made by ZEISS

Coverage of a wide wavelength range from 950 to 1,650 nm for fast in-line measurements and for calculating constituents

5. Easy integration into the client network

Numerous connections and industry standards are available: OPC UA and DA, Profinet, Profibus, EtherNet/IP, analogue and digital I/Os, Modbus, SQL-Database, Socket

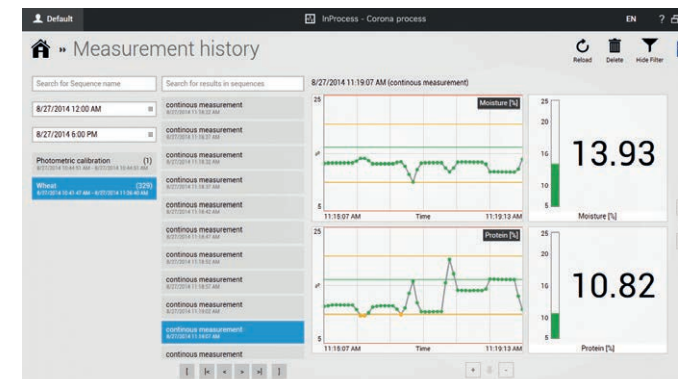
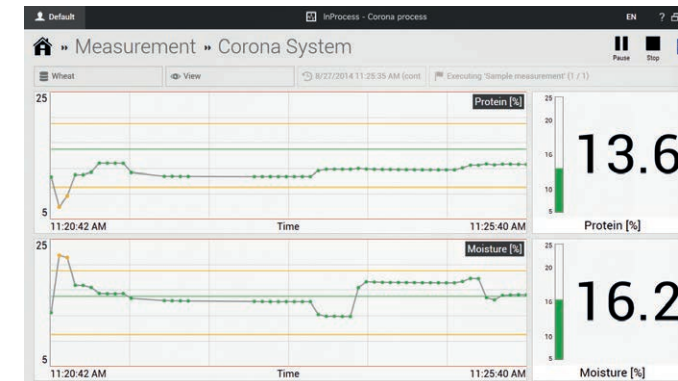


The software

Intuitive, arranged neatly, user friendly

Good software should be as powerful and versatile as it is intuitive and easy to use. Our InProcess software is designed not just to provide you with all the information you need quickly and easily, but also to fit around your specific needs, thanks to a range of customization options. InProcess is also ready for Industry 4.0 and provides the ideal platform to profit from connected spectroscopy and access your measurements from anywhere, at any time, thanks to easy cloud integration.

InProcess software enables an easy integration into production lines and intuitive usage. It can be configured according to the client-specific requirements.



- **Calibration:** support for common chemometrics software such as GRAMS IQ™, Aspen Unscrambler™, UCa™ or SL Calibration Wizard
- **Control:** management of more than one spectrometer is possible – with just one piece of software
- **User management:** creation of dedicated user groups with different access levels
- **Measurement:** display as spectrum, value or trend, automatic warning when limit values are exceeded, automatic start of measurement and elimination of implausible spectra
- **Integration:** communication with all established field bus systems and industrial standards
- **History:** access to all past measurement and reference results as well as data export of spectra, measured values and sample information
- **Diagnosis:** monitoring of spectrometer functionality with self-testing, important service information at the push of a button

Quality is measured by service. And vice versa.

We're there for you –
for the lifetime of a device

Good quality goes beyond product performance – it's about the level of service you receive as well. We're more than just a provider to our clients, we're partners, which is why the service we offer is as important to us as the product we manufacture. We're with you every step of the way, from first consultation to final purchase and then for the entire life cycle of the product.

We also understand that every client is different, which is why we can develop individual service packages that are tailored to your company, facility, process, or specific project. That's what we mean by partnership and service quality: a relationship based on trust and a detailed understanding of individual needs and circumstances.

Furthermore, you can rely on our global distribution and service network. Regardless of whether it's gratings, modules, spectrometers or solutions, hardware, software, or calibration, we're the only ones who develop and offer all spectrometer components from a single source. Exclusive service packages



guarantee optimal performance, increase service life and provide many years of reliable and precise results. You can also profit from our digital maintenance services, which provide you with user-friendly, location-independent solutions with no waiting times. And if something does need to be repaired on site, then our service technicians can be with you in next to no time.

Our expert service at a glance:

- Installation of equipment and software
- Application support for the whole product lifetime
- Preventive maintenance
- Customer-specific maintenance contracts
- On-site and in-house repairs
- Remote diagnostics, maintenance and repair



The measure of your success

Corona® extreme is the ideal solution to consistently control your production in even the most challenging environments. Accurate measurement results are imperative when it comes to optimizing costs and streamlining processes.

Thanks to exceptional performance and easy integration into production processes, our distributors, such as Jeff Lorton in the USA, help their clients increase their success with Corona® extreme.



Scan now to find out more about Corona® extreme from ZEISS

»By simply mounting the Corona® extreme NIR system in-line with the auger, directly after the hammer mill, our corn ethanol producing customers can rapidly and reliably detect the yield metrics for every shipment 24/7.

Measurement data for moisture, starch, protein and oil can be continuously collected and streamed to multiple destinations on or off-site, for automated or manual changes to the process in real time.«

Jeff Lorton, Ag Optix (USA)
ZEISS Spectroscopy Authorized Dealer

Carl Zeiss Spectroscopy GmbH

Carl-Zeiss-Promenade 10
07745 Jena, Germany

Office: + 49 3641 64-2838
Fax: + 49 3641 64-2485
info.spectroscopy@zeiss.com
www.zeiss.com/spectroscopy